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LIFE HISTORY STUDIES OF SOME FLORIDA APHIDS[1]

By ARTHUR C. MASON

GENERAL

It is a well-known fact that in the colder sections of the country the plant lice pass the winter in the egg stage. These eggs hatch in the spring into wingless agamic females. The process of producing apterous viviparous females usually continues throughout the season. Winged females sometimes appear, also, but in most cases only apterous forms are found. At the approach of cold weather the true sexual generations of both males and females appear. Fertilization takes place and the females lay eggs which live over winter to start the generation in the following spring. This, in general, is the mode of life of plant lice in the North.

Experimental work has been done which tends to show that the true sexual forms are produced only when conditions are not favorable to the continued life of a species in the adult form. Slingerland (23)[2] of Cornell, raised 99 generations without producing a single sexual form in his insectary where conditions of heat, plant food, etc., were favorable to the aphids. Therefore, this might happen naturally under favorable conditions. From this experiment it is reasonable to believe that plant lice can live and breed viviparously over winter in Florida, and this phenomenon has actually been observed by the writer in the case of several species of aphids. No true males have been produced, nor have any sexual eggs been laid. Other workers also have offered this as an explanation of the life of southern aphids. Quaintance (32), in describing the life history of *Aphis brassica* says that

[1] A synopsis of Part II of thesis entitled "Systematic and Biological Studies of Some of Florida Aphididae" presented by the writer to the University of Florida in 1915 for the degree of Master of Science. This is the second paper of the series; the third and concluding paper will appear in a following issue.

[2] Numbers refer to references cited. Complete list of references for the three papers will appear at the end of the third paper.

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they pass the winter without the production of males and females and winter eggs. Watson (36) says that in the warm climate of Florida, especially the southern part, viviparous and parthenogenetic reproduction will undoubtedly continue all winter in the case of the tomato louse, *Megoura solani,* and also of the green peach aphid, *Myzus persicae.* Considerable work has been done by the United States Bureau of Entomology on the southern grain louse, *Toxoptera graminum,* and they have found that it will breed viviparously all winter in all southern states. In their bulletin on the subject, Webster and Phillips (37) make the statement that there is no resting or egg stage and whenever there is a sufficient food supply and warm weather the aphids become very abundant. Hubbard (22) is also of the opinion that the southern aphids will live and breed viviparously over winter, and says that the males of the orange aphids rarely if ever appear.

In spite of the fact that several species have actually been observed living on the plants throughout the winter and that most of the workers of this and other Southern States admit the probability of viviparous breeding through the winter, it is a question as to where the vast majority of aphids pass the winter. It is probable that many, if not all, of those species which live on perennial plants or on plants which are fresh during the winter will live through the season without producing eggs. Those whose host plants die in the fall must find a different host or else live over winter in a different form, and it is probable that some at least live in the egg stage. A warm spell of weather and fresh tender shoots of their host plants will bring out large numbers of plant lice which may again disappear under adverse conditions. In all probability they produce sexual forms and lay sexual eggs when the weather conditions are bad and when their food plants die out.

MYZUS PERSICAE SULZ.

This insect, commonly called the green peach louse, is probably the most common aphid which occurs in this part of Florida, and with one or two exceptions the most destructive. The writer has found it in more or less abundance at all seasons of the year except during the summer months, and on a great variety of plants. It selects the tender shoots of fruit trees, many garden crops, and ornamental plants, and when conditions are favorable reproduces in large numbers, often becoming very troublesome. They have been observed several times abundant enough to cause cabbage leaves, and also turnips, collards, and other cruciferous plants to

curl up and die. Other instances where this louse has been seen in disastrous numbers were on Easter lilies, oranges, etc. Neal (26) speaks of *Myzus persicae* as very injurious to peach growing in Florida by causing the tender sprouts to curl up and die. In the green house, particularly, they reproduce very rapidly and are a serious pest.

The list of aphids as reported in the preceding paper in the Entomologist shows this louse to have been collected from thirty-five different plants in Florida. Additional plants as recorded elsewhere by Taylor (34), O'Kane (28), Chittenden (4), Gillette and Taylor (18) bring the list of hosts up to more than one hundred species. These hosts include practically all garden crops, many flowers, ornamentals, fruit trees, weeds, etc., and in widely separated families. The aphid apparently has no preference for the juices of any one plant or even single family of plants, but selects almost any which are fresh and tender. Neither is it confined to this part of the country. Other states from which *Myzus persicae* is reported are California (15), Virginia (4), Colorado (18), Minnesota (27). From these widely separated States we can conclude that the species is well scattered over this country. It is also reported by Buckton (3) from England.

Seasonal Occurrence. Beginning in the fall *Myzus persicae* was first found in October on cabbages and turnips. It continued to breed there during November and December and increased quite rapidly. In January and February it was less numerous, but a few could always be found in any field of cabbages, turnips, rape, and other related plants. It began to appear then on other plants, being found in March on lettuce, pansies, violets, and Easter Lilies. In April it appeared on some rose bushes, and on hybiscus and poinsettias, and also on beets and radishes in the garden. A month later, however, they had apparently all left those plants where they were so numerous and it was also difficult to find them on cabbages, but instead they were now numerous on Irish potatoes, corn and beans which were coming up. Here they lived while these plants were fresh, then abandoned them as they previously had the others. In June they were found on kale, egg-plant, and peppers, which were then growing, and on which they lived during the early part of the summer. Later, they seemed to entirely disappear, and although many plants were examined during the late summer no trace of them was found. Probably the adults live in small numbers on some wild plants where they were unnoticed. They were not on the garden and

ornamental plants where they lived during the early part of the year. In the fall they again appeared on the cabbages, turnips, radishes, rape, etc., as they had done the previous year. They continued to live on these plants in more or less abundance all through the winter. They also appeared in November on peach tree leaves, and in December on some fresh garden plants, as beets, carrots, kale, etc. All through the winter they could be found in more or less abundance on most young fresh garden plants, also on sunflowers and various weeds. In the greehouse, also, they lived on several plants but were very abundant and destructive on the young shoots of the orange trees. Hence it appears that *Myzus persicae* selects always the plants that are coming up fresh, instead of remaining on one plant all the year.

Life History. An effort was made to breed this species in jars throughout the winter and thus determine if reproduction was entirely parthenogenetic or if sexual forms occurred; also its rate of reproduction and other factors of biological importance. The work was carried on one winter in the greenhouse and the following winter in the open air insectary which was then available. Although the aphids probably reproduced faster in the greenhouse than under natural conditions, a line on the maximum number of generations could be obtained in the open air insectary, as well as its method of living and other data of importance.

For the purpose of the experiment, small cabbage plants were used, these being placed in pots and protected with lantern globes which were set over the plants and the top covered with a piece of cheese cloth. These pots were placed on the greenhouse bench and the plants kept in the best possible growing condition. Starting with six adults an effort was made to carry six lines of the aphids through the winter. The first-born young was removed by means of a camel's-hair brush and placed on a new plant. Then, to be more sure of preserving the line, the next two or three were placed on a substitute plant to be used in case the first one should die or be lost. Only the first young was raised to maturity and its offspring kept in the same way. However, after carrying on the work for three or four months it was found that the greenhouse was not a desirable place for it. In fact, it was impossible to carry through a line there. A fungus disease became so prevalent as to kill off the aphids before reaching maturity and thus whole lines were lost. Also the extreme heat on bright days caused the plants to wilt from drying out and the aphids, as a result, would die; therefore the work was abandoned in the latter part of April until the following fall.

The following data was secured from the breeding work in the greenhouse. First, no tendency to oviparous reproduction was seen. Both winged and apterous females were produced which continued to breed parthenogenetically throughout the winter. Second, the rate of parthenogenetic reproduction as tabulated[1] for all the lines shows that the average age of the mother at birth of first young was 11.1 days, average number of offspring 27.7 and the average length of life 17.7 days. This would allow for nearly three generations per month as the maximum rate of reproduction.

The following fall the work of breeding the aphids was started again, this time in the open-air insectary. Here the previous obstacles were not encountered, and the lines were carried through successfully. Three lines were started in November and run through the winter under natural conditions. From the tabulated data we find that the average age of the mother at the birth of the first young was 15.4 days, as compared with 11.1 days in the greenhouse. We would naturally expect this period to be shorter in the greenhouse than outside. 15.4 days would be a fair estimate of the average length of time for one generation of *Myzus persicae* during the winter months. This would allow for two generations of the aphids per month as the average maximum number. The average length of the productive period was 18.2 days, and the total average number of young was 42.8, which would make an average of 2.3 per day. The largest number for any one day was 8. The average length of the whole life was 36.2 days. There usually was a period of one to ten days between the birth of the last young and death. The nymph molts at the approximate ages of one or two days, five days, ten days, and fourteen days. A complete tabulation of the data on the life of one line shows that three generations usually overlap, also a day of high productiveness is usually followed by one of low productiveness, and vice versa.

The same method of reproduction occurred here as during the preceding winter in the greenhouse. No males or sexual eggs ever appeared in the breeding jars. Hence we can conclude that this species of aphid lives throughout the year on fresh plants and breeds viviparously continuously.

Parasites and Enemies. In the greenhouse, *Myzus persicae* was very heavily parasitized by the fungus, *Entomophthora*

[1] The tables are necessarily omitted because of lack of space and only summaries of the results given. A number of photographs illustrating the thesis are also excluded.

aphidis (identified by Dr. Roland Thaxter of Harvard). This disease was so serious, in fact, that it interfered with the breeding experiments which were being carried on there by killing off the aphids. It was also found on the aphids outside both in the spring and summer months. On one occasion it was so common that the under sides of the pansy leaves were covered with the dead bodies of the aphids. Suitable weather conditions are necessary for it to grow well and this is the reason it killed off all the aphids in the greenhouse where it is warm and humid. Undoubtedly this disease accounts largely for the disappearance of these insects during the summer for the warm humid climate of the rainy season is conducive to its growth. An interesting feature of this fungus is that it does not grow on other species of aphids. Several attempts were made to grow it on *Aphis gossypii* on orange trees in the greenhouse and under the same conditions as when it was growing on *Myzus persicae* on cabbages, but without success. The dead bodies covered with spores were rubbed over the bodies of *Aphis gossypii* and leaves with them were pinned to orange leaves containing *Aphis gossypii*, but in no cases could it be made to grow on other aphids, and never have any instances been observed under natural conditions where other species of aphids were attacked by it.

An internal hymenopterous parasite, *Diaeretus rapae* Curt. often parasitized this aphid very severely. The insects fly about and deposit their eggs in the bodies of the aphids by piercing them with their ovipositor. Two species of Syrphus flies were found feeding on the aphids, and also the lace-winged fly, *Chrysopa oculata* and a lady beetle, *Chilocorus bivulnerus*.

ALPHIS GOSSYPII Glover

Aphis gossypii commonly known as the melon louse, is perhaps the most important aphid in the State from an economic standpoint, and also one of the most numerous. It occurs in all seasons of the year and some observations were made as to its hosts and method of living through the year. An interesting fact about this aphid is the many forms in which it occurs. The citrus form is a dark slate color or velvety green, while it usually occurs on melons in a yellowish form. However, the yellow, melon form is also occasionally seen on orange trees. These forms are so radically different as to be hardly recognizable as the same species, in fact they were called different species for many years and known as the citrus aphid, the melon aphid, and the cotton

aphid, until Pergande (30) discovered that these were simply varieties of the one species, *Aphis gossypii.*

It has a number of other hosts also including many garden crops, flowers, weeds etc. The preferred food plants however are those belonging to the melon family. Many of these are listed as hosts for Florida in the preceding list. Others are reported by Chittenden (5) and Quaintance (32). About thirty different plants are mentioned as hosts. The insect also has a wide range of distribution both in the United States and other countries. Sanderson (33) says the melon aphid is found throughout this country, southward through Central America, and is usually more destructive in the South than in the North. Chittenden (5) gives its distribution as the West Indies, Mexico, Brazil, and doubtless elsewhere in South America, and generally distributed throughout the United States, but more injurious in the Southwest than elsewhere.

Seasonal Occurrence. This louse was found early in the fall feeding on orange trees and continued to live there throughout the fall or until December. They then disappeared and were not seen on the oranges again until the following April. During the winter however they appeared in large numbers in the greenhouse on young orange trees and for several weeks continued to breed so rapidly as to nearly kill the tender shoots of the trees. They collected on the new growth, causing the leaves there to curl up and become deformed. This continued until the latter part of March when there was a notable decrease in numbers in the greenhouse and by the middle of April none of them were present. They gradually disappeared, seeming to migrate as fast as they became adult. About this time the form of the species known as the melon aphid appeared on some calabash plants growing in another section of the greenhouse, and lived there for a short time.

In February they were collected outside on moonflowers, and in April appeared on the orange trees outside, where they lived for a short time and then evidently migrated to the melons. During the first part of April the species was present on Easter lilies in large numbers, but here, also, lived for only a short period. From the time the cucumbers began to grow in April *Aphis gossypii* lived on cucurbitaceous plants. It was never difficult to find them in fields of cucumbers, melons, squash, or cantaloupes, and often their presence was very noticeable. They continued to

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REPORTS OF MEETINGS OF THE SOCIETY

Jan. 23, 1922.

A business meeting of the Florida Entomological Society was called to order at 7:45 P. M., in Language Hall, President Watson in the chair. Members present: Stirling, Davis, Cody, Montgomery, Berger, Merrill, Burger, Lord and Beyer.

The report of the joint committees composed as follows: Dr. J. H. Montgomery, O. F. Burger and E. W. Berger, representing the Florida Entomological Society, and Mr. F. M. O'Byrne, Mr. E. L. Lord and A. H. Beyer, representing the Horticultural Seminar of the University of Florida, was delivered by the committee chairman, Dr. Montgomery. The report providing for joint meetings as recommended by the joint committees, was adopted by the Society.

The immediately succeeding procedure was the election of officers for the ensuing year, which were elected by acclamation as follows: Mr. Frank Stirling, president; Dr. O. F. Burger, vice president; Mr. A. H. Beyer, secretary; Mr. F. M. O'Byrne, business manager of ENTOMOLOGIST and treasurer; Dr. J. H. Montgomery, member Executive committee; Prof. J. R. Watson, Editor of ENTOMOLOGIST; Dr. Wilmon Newell, Associate Editor of ENTOMOLOGIST.

Smoker for Dr. Davis

After the business meeting the evening was given over to a smoker in honor of Dr. H. S. Davis, who has tendered his resignation as head of the Department of Zoology to accept the position of Fish Pathologist, U. S. Bureau of Fisheries, Washington, D. C.

At the smoker which convened at 8:15 there were present as guests: Dr. A. A. Murphree, Major Floyd, Dr. Trusler, Dr.

Anderson, Dr. Benton, Dr. Crow, Dr. Leigh, Dr. Shealy, Prof. Perry, Prof. Black, Dr. Simpson, Dr. Steik, and Prof. Willoughby. Mr. Stirling officiating. At the conclusion of the smoker Dr. Murphree suggested that a committee be delegated to prepare a smoker on the evening of January 30th in honor of visitors interested in the purposed Institute of Tropical Agriculture who are to be on the campus at that time. The motion was made and committee was appointed by Chairman Stirling.

A. H. BEYER, Secretary.

Feb. 27, 1922.

The Society met in regular monthly joint meeting with the Horticultural Seminar of the University and was called to order by President Floyd of the Horticultural Seminar. Members present: Stirling, Lord, Beyer, Berger, Watson, Montgomery, Merrill, Burger and Stone.

Mr. Stirling exhibited samples of an "orangelo," a hybrid between an orange and a grapefruit. This tree was grown from budwood from the Bureau of Plant Industry, U. S. D. A., by Mr. Henderson on the lot now owned by Mr. Stirling.

The first paper of the evening was by Dr. W. B. Tisdale on The Development of Cabbage Resistant to the Fusarium Disease Commonly Known as "Yellows." Prof. Watson gave a report on the entomological meetings of the A. A. A. S. at Toronto. Dr. Montgomery gave a report on the meeting of the Cotton States Entomologists at Atlanta during the previous week. Prof. Lord gave some notes on horticulture.

PERSONALS

A new member of our Society is Mr. Reginald Hart, formerly with the Bureau of Plant Sanitation of Cuba, an entomologist of wide experience with tropical insects, who has been added to the State Plant Board with headquarters at Gainesville.

Another new member is Mr. Chas. Ballou of Havana, a member of the Bureau of Plant Sanitation of Cuba.

Dr. W. B. Tisdale has entered upon his duties as Pathologist of the Tobacco Substation at Quincy. Dr. Tisdale is a native Floridian who received his doctor's degree from the University of Wisconsin where he has also been teaching.

Dr. J. S. Rogers has entered upon his duties as head of the Department of Biology in the University, taking the place of Dr. Davis. Dr. Rogers comes to Florida from the University of Michigan.

Mr. Geo. D. Smith, a specialist in boll weevil control, has resigned from the Bureau of Entomology to accept the position of Associate Entomologist of the Plant Board. He will have has headquarters at Madison.

Our president, Mr. Frank Stirling, left for Raiford on March 1st. The length of his stay is "indeterminate."

Prof. L. C. Corbett of the Bureau of Plant Industry, with headquarters at Washington, recently accompanied Director Newell on a visit to the Citrus Sub-station at Lake Alfred.

"Red Spider on the Avocado" is the title of Bulletin 1035 of the U. S. D. A. (Professional Paper) by Mr. G. F. Mosnette. This well illustrated and valuable bulletin should be in the hands of every member interested in the avocado industry.

LIFE HISTORY STUDIES OF SOME FLORIDA APHIDS

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live here throughout most of the summer, or until the vines dried up, being collected on watermelons as late as July 23. After that, nothing was seen of them until October when they again appeared on orange trees. The latter part of November there occurred a freeze which killed the orange leaves while many of the aphids were present on some trees. The lice were not hurt by the freeze but continued to live for two days afterward or until the leaves wilted and dried up, when they died for lack of food. In January they again appeared in the greenhouse and continued to live there in increasing numbers throughout the rest of the winter, or until the first part of April. An interesting feature about them is that they will not live in the greenhouse in the fall. When first found in October, several attempts were made to colonize them on the orange trees in the greenhouse, but without success.

This, in general, seems to be the life history of this louse in Florida. They will live on melons and other fresh plants during the spring and summer and then migrate to the orange trees in the fall. The season of late summer and early fall, after the melon vines have disappeared, is probably spent on some of the numerous wild plants on which they have been reported. It is possible that they lay winter eggs on the orange trees to pass a part of the winter, at least in the northern part of the state or when the winter is especially cold. This may account for the fact that they were not found outside on the oranges except during part of the winter. However, no sexual forms or eggs were ever seen and it is the writer's belief that they did not

occur. Hubbard (22) is also of the opinion that the orange aphid lives over winter as an adult on the orange trees. The males and winter eggs were not discovered and probably do not occur, at least in ordinary seasons.

Parasites. *Aphis gossypii* has several parasites and predaceous enemies. It is severely infested by the internal parasite, *Diaeretus rapae,* which often prevents it from getting started in a locality. The lace-winged flies, *Chrysopa oculata,* and *Hemerobius sp.,* and several species of lady beetles and syrphus flies also prey upon this aphid. They are often seen on orange trees which are harboring the lice. The aphid is not susceptible to fungus diseases however. Attempts made to get two species of fungi to live on them in the greenhouse failed. *Entomophorus aphidis,* which kills off *Myzus persicae* in large numbers, would not attack *Aphis gossypii,* nor would *Acrostalagmus albus,* a culture of which was received from Porto Rico growing on the cane aphid *(Sipha flava).*

LACHNUS PINI L.

Although not of any economic importance some studies were made of this large pine aphid since it was used in some of the experimental work. Like the two preceding species, these aphids lived on the pine trees throughout the winter and continued to produce their young viviparously. The pines not being deciduous a fresh supply of food was always available. The cold was never sufficiently acute to kill the adults as in the case of its northern congenors, and hence winter eggs were not a necessity.

This aphid never occurs in large numbers probably due to the high percentage of parasitism. Its large size makes it an easy prey for hymenopterous parasites. However a few of them could usually be found on the small pines of the species *Pinus taeda.* They continued to live there all through the winter and produce their young alive. In the summer, however, they became very scarce and were difficult to find.

Life History. No very complete experiments were conducted to work out the life history of the species, but a good line on the number of generations and rapidity of breeding was obtained from the experimental work which will be recorded in the next paper. The average time required for the young to become adult was nineteen days, or in other words, the number of generations will be determined at this rate. Several days often elapse between the time of becoming adult and that of starting to repro-

duce, particularly in the case of winged females, hence a fair estimate of the average length of a generation probably will be nearly thirty days. In the laboratory, however, the average age of maturity was 12.6 days which is less than under natural conditions. Hence it is seen that the rate of reproduction for this aphid is much lower than for those previously described. This also accounts to some extent for their lack of abundance.

Parasites. The most destructive parasite of this louse is the internal hymenopterous insect, *Aphidius bifasciatus* Ashm. This is a small wasp-like parasite but quite abundant, and the cause of killing many of the colonies. On several occasions one of these was observed ovipositing in the aphids. It would fly to the branch on which the aphids were feeding and approach cautiously until near the colony, then make a quick dart toward them and thrusting the abdomen between and under the legs, would quickly pierce the aphid with its ovipositor and run back. If undisturbed, it would repeat this practice several times. However, the ants which usually attend these aphids would often watch for this invader and drive him off before he reached the aphids. The parasite also appeared to be afraid of the ants. Another internal parasite of this louse is *Aphidius pinaphidis* Ashm. A few of these were bred from parasitized aphids, but they evidently are not as numerous as the other species. *Pachyneuron micans* How. was also bred from some parasitized bodies, but this may be a secondary parasite.

Other enemies are the lady beetles, syrphus flies and aphis lions. Adults and larvae of *Coccinella sanguinea* were collected while feeding on the aphids. Syrphus fly larvae were often found feeding on the aphids and also *Chrysopa oculata* and *Hemerobius sp.*

Ants. An interesting feature of *Lachnus pini* is the protection which the ants give them. Like all other plant lice the colonies are constantly attended by ants, and in this case several species of ants have been noted. They assist in spreading the species by carrying their young ones about and also protect them by driving away their parasites and predatory enemies. The most noticeable method of protection was a sort of cover built over them by the ants. The primary object of this probably was to keep parasites away but it would also serve as a protection against cold and storms. The ants were often observed during the fall and early winter carrying particles of loose bark and the

woolly covering of the pine bark and building a covering over the colonies of aphids. Another advantage of the ants, which, by the way, is mutual, is by eating the honey-dew secreted by the aphids.

NEW THYSANOPTERA FROM FLORIDA. IX.

J. R. WATSON

71. Idolothrips flavipes Hood.

From dry leaves on the ground in the forest. Hog-town Creek, Feb. 27, 1921. Gainesville, March, 1921. These represent but the third capture for this species—all from dried leaves. It was described from Illinois and Morgan has recorded it from Tennessee.

72. Hoplandrothrips pergandei (Hinds). (Phloeothrips pergandei Hinds.).

Sweeping grass in pasture. Gainesville, Fla., Feb. 25, 1922. Previously reported from Amherst, Mass. (type locality) and Tennessee (Morgan).

73. Hindsiana pini n. sp.

Head, thorax, and tube brown; most of abdomen, legs and antennae light yellow.

Measurements: Total body length 1.1 mm. Head; length 0.16, width 0.15 mm.; prothorax, length 0.16, width 0.25 mm.; mesothorax, width at the base 0.23 mm.; metathorax, greatest width 0.18 mm.; abdomen, greatest width 0.28 mm.; tube, length 0.11, width at base 0.05, at apex 0.03 mm. Antennae: total length 0.28 mm.; segment 1,18; 2,40; 3,43; 4,48; 5,48; 6,40; 7,38; 8,32 microns.

Head a little longer than broad, cheeks slightly arched. Postocular bristles long, colorless and bearing a small knob at the apex; a pair of minute bristles opposite them near the median line, one behind each ocellus, and one directly behind each of these and opposite the posterior margins of the eyes. Eyes small, not protruding, black, non-pilose, facets large. Ocelli large; posterior pair situated opposite the anterior third of the eyes but not touching their margins; yellow, bordered with dark crescents. Mouth cone reaching 2-3 across the prosternum, rounded at the end. Antennae clear yellow except segment 1 which is shaded with brown and 7 and 8 which are brown. Segment 1 cylindrical; 2 urn-shaped; 3-5 short clavate; 6, ovate, brownish yellow; 7, obovate; 8, conical. Bristles and sense cones short, colorless and inconspicuous, one each on the outside near the apex of segments 5 and 6 fairly long.

Prothorax about as long as the head and half again as wide; one strong knobbed bristle on each posterior angle and a similar one on each coxa; a short one on each anterior angle and one midway on each side. Mesothorax much narrower than the prothorax and the sides abruptly converging posteriorly. Metathorax but little wider than the posterior border of the mesothorax. This very narrow pterothorax gives the insect the appearance of having a slender waist. Legs clear yellow except the bases of the fore femora which are clouded with brown. Fore femora slightly enlarged. Fore tarsus with a short curved spine. Wings well developed but their membranes not attaining the end of the abdomen; that of the hind wings clear, of the forewings gray, narrowed in the middle, fringed with long hairs, three interlocated ones.

Abdomen elongated oval in outline, clear yellow, clouded with brown towards the base; bristles few, colorless, short except on the last three segments each of which bears a single long bristle near each posterior angle; those on the ninth segment much longer than the tube and pointed, all others knobbed. Tube rather small brown; terminal bristles short, pointed.

Described from a single female taken from a young long-leaved pine tree at Blanton, Fla. February, 1922.

The genus *Hindsiana* Karny is distinguished from *Haplothrips* by the light color of the abdomen and the long bristles on the ninth abdominal segment. Karny in "Zur Systematik der Orthopteroiden Insecten" (Treubia, vol. I, Livr. IV. pp. 211-269 gives a very useful key to the families and genera of Thysanoptera.)

ANOTHER NEW THRIPS FROM COCOANUTS FROM CUBA

J. R. WATSON

Hindsiana cocois, n. sp.

General color light brown, tibiae, tarsi, and intermediate antennal segments yellow.

Measurements: Total body length 1.2 mm. Head, length 0.18, breadth 0.13 mm.; prothorax, length 0.11, breadth 0.22 mm.; mesothora, breadth 0.21 mm.; metathorax, breadth 0.22 mm.; tube, length 0.10, width at base 0.05, at the apex 0.03 mm. Antennae: total length 0.29 mm.

Antennal Segment	1	2	3	4	5	6	7	8
Length	24	67	43	49	40	37	41	27 microns
Breadth	....	27	24	26	24	21	19	12 microns

Head considerably darker than the body; nearly 1.5 times as long as broad, vertex smooth; cheeks slightly bulging, roughened by a few low papillae. Post ocular bristles large, almost colorless, expanded at the apex into a knob. Eyes rather small, occupying less than a third the length and less than a quarter the width of the head, not pilose. Ocelli widely separated, posterior pair situated anterior to the middle of the eyes, bordered with dark crescents. Mouth cone short, not reaching the middle of the prosternum, slightly swollen at the base, very bluntly rounded at the tip. Antennae: segment 1 dark brown, 2,3 and the base of 4 yellow, others progressively darker towards the tip; 1 trapezoidal, rather large, 32 microns wide at the base, 22 at the apex; 2 urn-shaped; 3 wedge-shaped; bristles, and sense cones short, pale, and inconspicuous.

Prothorax about two-thirds the length of the head, breadth twice the length, a heavy, knobbed bristle on each posterior angle and a somewhat weaker one on each coxa.

Pterothorax slightly narrower than the prothorax, sides straight, converging strongly posteriorly. Legs rather long and slender. Wings well developed, margined with long but comparatively few hairs, 3 or 4 inter-located ones on the fore wings. Membranes of the anterior pair quite dark, strongly constricted in the middle.

Abdomen cylindrical, rather long, yellow except the tube. Posterior segments provided with long, pointed yellow bristles. Tube dark brown, abruptly swollen at the base, terminal bristles twice as long as the tube, pointed, brown. Male not seen.

Larvae bright yellow with considerable bright red hypodermal pigmentation. Tube and antennae brown. Eyes red.

Described from five females and two larvae found by Mr. Geo. B. Merrill under scale caps of cocoanuts from Cuba, intercepted at Key West quarantine station by inspectors of the State Plant Board. Occurred in company with a single specimen of *Franklinothrips vesperformis* (Crawford).

Type in the author's collection.

SOME BEETLES NEW TO FLORIDA

J. R. WATSON

Among a collection of beetles recently determined for the Experiment Station by Dr. W. S. Blatchley are the following which are not recorded for Florida in Leng's "Catalogue of the Coleoptera of America, North of Mexico." Unless otherwise indicated they were collected by the writer in the vicinity of Gainesville.

Cicindela rectilatera Chd. Along Prairie Creek. Abundant on mud banks in the stream. June 23, 1918. Campus of the University, July 7, 1918.

Baeocera deflexa Csy. Beaten from *Aesculus pavia.* March 4, 1917.

Tritoma affinis. On *Coprinus,* Aug. 19, 1919.

Pachybrachys viduatus (Fab.). Shrubs in "flatwoods" July 4, 1918. With *P. litigiosus.*

Microtomus sericans Lec.

Eros aurora Hbst. At blooms of Bee Balm (*Monarda*), Oct. 10, 1920.

Litargus balteatus Lec. Sweeping grass and herbs at Lake Wales, June 10, 1920.

Scymnus americana. On cottony cushion scale (*Icerya purchasi*) at Key West, March 5.

Cryptorhopalum picricorne Lec. Gainesville, abundant in *Crataegus* bloom. March 10, 1917; Sanford, in bloom of *Cassia sp.* Aug. 3, 1918.

Anthrenus scrophularia Lis. On blossoms of wild plum. Feb. 23, 1919.

Pocadius helvolus Er. In puffball, June 30, 1918.

Scirtes orbiculatus (Fab.). On French mulberry, June 16, 1918; from rotting sweet potatoes May 22, 1920.

Cyphon obscurus. Sumatra, Fla. On *Citrus.*

Attalus humerales. At bloom of cherry laurel, Feb. 12, 1919.

Enoclerus nigripes Say. On Basswood May 18, 1920.

Haltica amoena Horn. Leng records this from Georgia but it is given in Blatchley's list from Sanford, 1915. Among the pine needles on the floor of a pure stand of long leaf pine Jan. 27, 1918; Viking, Fla., June 15, 1915.

Anoplitis inaequalis (Web.). On *Polymnia* and *Rhus* July 21, 1918.

Ganascus ventricosus Lec. Recorded by Leng as "N. C. (Fla.?)" Gainesville on *Hickoria,* Oct.; Tavares on closely grazed carpet grass.

Gnathium francilloni Kirby. On various flowers, Sep.

Hydnocera suturalis Klug. Recorded by Leng as occurring in South Florida; Gainesville, May 22, 1920, on *Erigeron ramosus.*

Ceratona caminea (Fab.) Bean Leaf Beetle. Common about Quincy but

rare about Gainesville. A single capture by sweeping grass along a stream. June 9, 1918.

Adistemia watsoni (Woll). At flowers of Astragulus March 15, 1917.

Baris australis Blatch. Recorded in Jour. N. Y. Ent. Soc. June, 1920. Palatka. On New Jersey Tea (*Ceanothus*) Sept. 12, 1919.

Sphenophorus venatus Say Gainesville Jan. 1.

Tanymecus lacaena Hbst. There seems to be no record of the food plants of this beetle. It feeds in numbers on *Baccharis* and to a less extent on dog fennell (*Eupatorium capillifolium*).

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